

20. (First Amended) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom;

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly being adapted to reduce the reaction forces in at least two degrees of freedom that are transferred to the stage base; and

a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along the X axis and inhibits movement of the X reaction component relative to the Y reaction component along the Y axis.

23. (First Amended) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom;

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concluded

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component including a pair of spaced apart X reaction masses and the Y reaction component including a pair of spaced apart Y reaction masses, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly being adapted to reduce the reaction forces in at least two degrees of freedom that are transferred to the stage base; and

a mass guide assembly that connects the X reaction masses to the Y reaction masses, allows the X reaction masses to move independently relative to the Y reaction masses along the X axis and inhibits movement of the X reaction masses relative to the Y reaction masses along the Y axis.

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28. (First Amended) The stage assembly of claim 93 further comprising a mass guide assembly that connects the X reaction masses to the reaction frame, allows the X reaction masses to move independently relative to the reaction frame along the X axis and inhibits movement of the X reaction masses relative to the reaction frame along the Y axis.

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47. (First Amended) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis;

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a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component moving relative to the stage base along the X axis, the X reaction component moving relative to the Y reaction component along the X axis and along the Y axis, and the X reaction component and the Y reaction component move concurrently along the Y axis; and

a reaction mover assembly that adjusts (i) the position of the X reaction component relative to the Y reaction component along the X axis, (ii) the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis, and (iii) the position of the Y reaction component and the X reaction component relative to the stage base along the X axis.

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52. (First Amended) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

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a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis;

a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including a X reaction component and a Y reaction component, the X reaction component including a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component, the X reaction component moving relative to the stage base along the X axis and along the Y axis, the X reaction component and the Y reaction component moving concurrently along the Y axis, and the Y reaction component including a pair of spaced apart Y reaction masses; and

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a mass guide assembly that connects the X reaction masses to the Y reaction masses, allows the X reaction masses to move independently relative to the Y reaction masses along the X axis and inhibits movement of the X reaction masses relative to the Y reaction masses along the Y axis.

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57. (First Amended) The stage assembly of claim 97 further comprising a mass guide assembly that connects the X reaction masses to the reaction frame, allows the X reaction masses to move independently relative to the reaction frame along the X axis, and inhibits movement of the X reaction masses relative to the reaction frame along the Y axis.

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80. (First Amended) A method for making a stage assembly that moves a device relative to a stage base, the method comprising the steps of:

providing a stage that retains the device;

connecting a stage mover assembly to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

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coupling a reaction mass assembly to the stage mover assembly, the reaction mass assembly including a first X reaction mass, a second X reaction mass and a reaction frame, the first X reaction mass and the second X reaction mass moving independently along an X axis, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base, the reaction frame being coupled to the X reaction masses so that the reaction frame moves relative to the stage base along the X axis.

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Please cancel claims 1-11, 13-19, 21, 22, 24-27, 37-46, 48-51, 54-56, 64-79 and 83-89 without prejudice.

Please add new claims 90-247, as follows:

90. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom;

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base; and

a reaction mover assembly that adjusts the position of the X reaction component relative to the Y reaction component along the X axis, the reaction mover assembly adjusting the position of the X reaction component and the Y reaction component relative to the stage base along the X axis, the Y axis and about a Z axis.

91. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly being

adapted to reduce the reaction forces in at least two degrees of freedom that are transferred to the stage base; and

a reaction mover assembly that adjusts the position of the Y reaction component and the X reaction component relative to the stage base along the X axis, the Y axis and about a Z axis.

92. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component including a pair of spaced apart X reaction masses and the Y reaction component including a generally planar shaped reaction base, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly being adapted to reduce the reaction forces in at least two degrees of freedom that are transferred to the stage base.

93. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component including a pair of spaced apart X reaction masses and the

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Y reaction component including a reaction frame, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component moving concurrently along a Y axis relative to the stage base, the reaction mass assembly being adapted to reduce the reaction forces in at least two degrees of freedom that are transferred to the stage base.

94. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis; and

a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including a X reaction component that moves relative to the stage base along the X axis, along the Y axis and about a Z axis.

95. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis;

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a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component moving relative to the stage base along the X axis, the X reaction component moving relative to the Y reaction component along the X axis and along the Y axis, and the X reaction component and the Y reaction component move concurrently along the Y axis; and

a reaction mover assembly that adjusts (i) the position of the X reaction component relative to the Y reaction component along the X axis, (ii) the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis, (iii) the position of the Y reaction component and the X reaction component relative to the stage base along the X axis, and (iv) the position of the Y reaction component and the X reaction component relative to the stage base about a Z axis.

96. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis; and



a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component including a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component, the X reaction component moving relative to the stage base along the X axis, the X reaction component moving relative to the Y reaction component along the Y axis, the X reaction component and the Y reaction component moving concurrently along the Y axis, and the Y reaction component including a generally planar shaped reaction base.

97. (New) A stage assembly that is adapted to move a device relative to a stage base, the stage assembly comprising:

a stage adapted to retain the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage along an X axis and along a Y axis and generating reaction forces along the X axis and along the Y axis; and

a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly being adapted to reduce the reaction forces along the X axis and along the Y axis, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component including a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component, the X reaction component moving relative to the stage base along the X axis, the X reaction component moving relative to the Y reaction component along the Y axis, the X reaction component and the Y reaction component moving concurrently along the Y axis, the Y reaction component including a reaction frame.

98. (New) A method for making a stage assembly that moves a device relative to a stage base, the method comprising the steps of:

providing a stage that retains the device;

connecting a stage mover assembly to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom;

coupling a reaction mass assembly to the stage mover assembly, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component moving relative to the Y reaction component along an X axis, the X reaction component and the Y reaction component move concurrently along a Y axis, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base; and

adjusting the position of the Y reaction component and the X reaction component relative to the stage base along an X axis and about a Z axis with a reaction mover assembly.

99. (New) A stage assembly that moves a device relative to a stage base, the stage assembly comprising:

a stage that retains the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating a reaction force along a Y axis; and

a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly including an X reaction component and a Y reaction component, the X reaction component moving relative to the Y reaction component, the reaction components moving along the Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

100. (New) The stage assembly of claim 99 wherein the stage mover assembly moves the stage along the Y axis directly causing the X reaction component and the Y reaction component to move along the Y axis.

101. (New) The stage assembly of claim 99 wherein the X reaction component moves relative to the stage base with three degrees of freedom.

102. (New) The stage assembly of claim 101 wherein the Y reaction component moves relative to the stage base with three degrees of freedom.

103. (New) The stage assembly of claim 99 wherein the stage mover assembly comprises an X stage mover that moves the stage along the X axis, the X stage mover being coupled to the X reaction component so that movement of the stage by the X stage mover results in movement of the X reaction component along the X axis.

104. (New) The stage assembly of claim 103 wherein the stage mover assembly comprises a Y stage mover that moves the stage along the Y axis, the Y stage mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

105. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with one degree of freedom.

106. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with two degrees of freedom.

107. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with three degrees of freedom.

108. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis.

109. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

110. (New) The stage assembly of claim 99 further comprising a reaction mover assembly that adjusts the position of the X reaction component and the Y reaction component relative to the stage base about a Z axis.

111. (New) The stage assembly of claim 99 wherein the X reaction component includes a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component.

112. (New) The stage assembly of claim 99 further comprising a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along the X axis and inhibits movement of the X reaction component relative to the Y reaction component along the Y axis.

113. (New) The stage assembly of claim 99 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a generally planar shaped reaction base.

114. (New) The stage assembly of claim 99 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a pair of spaced apart Y reaction masses.

115. (New) The stage assembly of claim 114 further comprising a mass guide assembly that connects the X reaction masses to the Y reaction masses, allows the X

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reaction masses to move independently relative to the Y reaction masses along the X axis and inhibits movement of the X reaction masses relative to the Y reaction masses along the Y axis.

116. (New) The stage assembly of claim 114 further comprising a reaction guide assembly that allows the Y reaction masses to move relative to the stage base along the Y axis and inhibits movement of the Y reaction masses along the X axis.

117. (New) The stage assembly of claim 114 further comprising a reaction mover assembly that adjusts the position of the X reaction masses relative to the Y reaction masses along the X axis.

118. (New) The stage assembly of claim 117 wherein the reaction mover assembly adjusts the position of the Y reaction masses and the X reaction masses relative to the stage base along the Y axis.

119. (New) The stage assembly of claim 99 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a reaction frame.

120. (New) The stage assembly of claim 119 further comprising a mass guide assembly that connects the X reaction masses to the reaction frame, allows the X reaction masses to move independently relative to the reaction frame along the X axis and inhibits movement of the X reaction masses relative to the reaction frame along the Y axis.

121. (New) The stage assembly of claim 120 further comprising a reaction guide assembly that allows the reaction frame to move relative to the stage base along the Y axis and inhibits movement of the reaction frame along the X axis.

122. (New) The stage assembly of claim 120 further comprising a reaction mover assembly that adjusts the position of the X reaction masses relative to the reaction frame along the X axis.

123. (New) The stage assembly of claim 122 wherein the reaction mover assembly adjusts the position of the reaction frame and the X reaction masses relative to the stage base along the Y axis.

124. (New) The stage assembly of claim 120 wherein the reaction frame moves relative to the stage base about the Z axis.

125. (New) The stage assembly of claim 120 further comprising a reaction mover assembly that adjusts the position of the reaction frame and the X reaction masses relative to the stage base about the Z axis.

126. (New) The stage assembly of claim 99 wherein the reaction components move along the Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

127. (New) The stage assembly of claim 99 wherein the reaction components move concurrently along the Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

128. (New) An exposure apparatus including the stage assembly of claim 99.

129. (New) A device manufactured with the exposure apparatus according to claim 128.

130. (New) A wafer on which an image has been formed by the exposure apparatus of claim 128.

131. (New) A stage assembly that moves a device relative to a stage base, the stage assembly comprising:

a stage that retains the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces;

a reaction mass assembly coupled to the stage mover assembly, the reaction mass assembly reducing the reaction forces in at least one degree of freedom that is transferred to the stage base, the reaction mass assembly including a Y reaction component and an X reaction component that moves relative to the Y reaction component, one of the reaction components moving about a Z axis relative to the stage base.

132. (New) The stage assembly of claim 131 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

133. (New) The stage assembly of claim 131 wherein the X reaction component moves relative to the stage base with three degrees of freedom.

134. (New) The stage assembly of claim 133 wherein the Y reaction component moves relative to the stage base with three degrees of freedom.

135. (New) The stage assembly of claim 131 wherein the stage mover assembly comprises an X stage mover that moves the stage along an X axis, the X stage mover being coupled to the X reaction component so that movement of the stage by the X stage mover results in movement of the X reaction component along the X axis.

136. (New) The stage assembly of claim 135 wherein the stage mover assembly comprises a Y stage mover that moves the stage along a Y axis, the Y stage

mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

137. (New) The stage assembly of claim 131 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base with two degrees of freedom.

138. (New) The stage assembly of claim 131 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base with three degrees of freedom.

139. (New) The stage assembly of claim 131 further comprising a reaction mover assembly that adjusts the position of each of the reaction components relative to the stage base with three degrees of freedom.

140. (New) The stage assembly of claim 131 further comprising a reaction mover assembly that adjusts the position of each of the reaction components relative to the stage base about the Z axis.

141. (New) The stage assembly of claim 131 wherein the X reaction component includes a first X reaction mass and a second X reaction mass that move independently along an X axis relative to the Y reaction component.

142. (New) The stage assembly of claim 131 further comprising a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along an X axis and inhibits movement of the X reaction component relative to the Y reaction component along a Y axis.

143. (New) The stage assembly of claim 131 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a generally planar shaped reaction base.



144. (New) The stage assembly of claim 131 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a pair of spaced apart Y reaction masses.

145. (New) The stage assembly of claim 144 further comprising a mass guide assembly that connects the X reaction masses to the Y reaction masses, allows the X reaction masses to move independently relative to the Y reaction masses along an X axis and inhibits movement of the X reaction masses relative to the Y reaction masses along a Y axis.

146. (New) The stage assembly of claim 144 further comprising a reaction guide assembly that allows the Y reaction masses to move relative to the stage base along a Y axis and inhibits movement of the Y reaction masses along an X axis.

147. (New) The stage assembly of claim 144 further comprising a reaction mover assembly that adjusts the position of the X reaction masses relative to the Y reaction masses along an X axis.

148. (New) The stage assembly of claim 147 wherein the reaction mover assembly adjusts the position of the Y reaction masses and the X reaction masses relative to the stage base along a Y axis.

149. (New) The stage assembly of claim 131 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a reaction frame.

150. (New) The stage assembly of claim 149 further comprising a mass guide assembly that connects the X reaction masses to the reaction frame, allows the X reaction masses to move independently relative to the reaction frame along an X axis

and inhibits movement of the X reaction masses relative to the reaction frame along a Y axis.

151. (New) The stage assembly of claim 150 further comprising a reaction guide assembly that allows the reaction frame to move relative to the stage base along the Y axis and inhibits movement of the reaction frame along the X axis.

152. (New) The stage assembly of claim 150 further comprising a reaction mover assembly that adjusts the position of the X reaction masses relative to the reaction frame along the X axis.

153. (New) The stage assembly of claim 152 further comprising a reaction mover assembly that adjusts the position of the reaction frame and the X reaction masses relative to the stage base along the Y axis.

154. (New) The stage assembly of claim 150 wherein the reaction frame moves relative to the stage base about the Z axis.

155. (New) The stage assembly of claim 150 further comprising a reaction mover assembly that adjusts the position of the reaction frame and the X reaction masses relative to the stage base about the Z axis.

156. (New) The stage assembly of claim 131 wherein the X reaction component moves relative to the Y reaction component along an X axis, and the reaction components move concurrently in the same direction along a Y axis.

157. (New) The stage assembly of claim 131 wherein the Y reaction component supports at least a portion of the X reaction component.

158. (New) The stage assembly of claim 131 wherein the reaction components move along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

159. (New) The stage assembly of claim 131 wherein the reaction components move concurrently along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

160. (New) An exposure apparatus including the stage assembly of claim 131.

161. (New) A device manufactured with the exposure apparatus according to claim 160.

162. (New) A wafer on which an image has been formed by the exposure apparatus of claim 160.

163. (New) A stage assembly that moves a device relative to a stage base, the stage assembly comprising:

a stage that retains the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component moving relative to the Y reaction component, the Y reaction component including a generally planar shaped reaction base, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base.

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164. (New) The stage assembly of claim 163 wherein the stage mover assembly moves the stage along a Y axis directly causing the X reaction component and the Y reaction component to move along the Y axis.

165. (New) The stage assembly of claim 163 wherein one of the reaction components moves relative to the stage base with three degrees of freedom.

166. (New) The stage assembly of claim 163 wherein each of the reaction components moves relative to the stage base with three degrees of freedom.

167. (New) The stage assembly of claim 163 wherein the stage mover assembly comprises an X stage mover that moves the stage along an X axis, the X stage mover being coupled to the X reaction component so that movement of the stage by the X stage mover results in movement of the X reaction component along the X axis.

168. (New) The stage assembly of claim 167 wherein the stage mover assembly comprises a Y stage mover that moves the stage along a Y axis, the Y stage mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

169. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with one degree of freedom.

170. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with two degrees of freedom.

171. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with three degrees of freedom.

172. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis.

173. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

174. (New) The stage assembly of claim 163 further comprising a reaction mover assembly that adjusts the position of the X reaction component and the Y reaction component relative to the stage base about a Z axis.

175. (New) The stage assembly of claim 163 wherein the X reaction component includes a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component.

176. (New) The stage assembly of claim 163 further comprising a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along the X axis and inhibits movement of the X reaction component relative to the Y reaction component along the Y axis.

177. (New) The stage assembly of claim 163 wherein the X reaction component includes a pair of spaced apart X reaction masses.

178. (New) The stage assembly of claim 163 wherein the Y reaction component supports at least a portion of the X reaction component.

179. (New) The stage assembly of claim 163 wherein the X reaction component moves relative to the Y reaction component along an X axis, and the reaction components moves concurrently in the same direction along a Y axis.

180. (New) The stage assembly of claim 179 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

181. (New) The stage assembly of claim 163 wherein the reaction components move along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

182. (New) The stage assembly of claim 163 wherein the reaction components move concurrently along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

183. (New) An exposure apparatus including the stage assembly of claim 163.

184. (New) A device manufactured with the exposure apparatus according to claim 183.

185. (New) A wafer on which an image has been formed by the exposure apparatus of claim 183.

186. (New) A stage assembly that moves a device relative to a stage base, the stage assembly comprising:

a stage that retains the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the Y reaction component including a reaction frame, the X reaction component moving relative to the Y reaction component, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base.

187. (New) The stage assembly of claim 186 wherein the stage mover assembly moves the stage along a Y axis directly causing the X reaction component and the Y reaction component to move along the Y axis.

188. (New) The stage assembly of claim 186 wherein one of the reaction components moves relative to the stage base with three degrees of freedom.

189. (New) The stage assembly of claim 186 wherein each of the reaction components moves relative to the stage base with three degrees of freedom.

190. (New) The stage assembly of claim 186 wherein the stage mover assembly comprises an X stage mover that moves the stage along an X axis, the X stage mover being coupled to the X reaction component so that movement of the stage by the X stage mover results in movement of the X reaction component along the X axis.

191. (New) The stage assembly of claim 190 wherein the stage mover assembly comprises a Y stage mover that moves the stage along a Y axis, the Y stage mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

192. (New) The stage assembly of claim 186 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with two degrees of freedom.

193. (New) The stage assembly of claim 186 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with three degrees of freedom.

194. (New) The stage assembly of claim 186 further comprising a reaction mover assembly that adjusts the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis.

195. (New) The stage assembly of claim 186 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

196. (New) The stage assembly of claim 186 further comprising a reaction mover assembly that adjusts the position of the X reaction component and the Y reaction component relative to the stage base about a Z axis.

197. (New) The stage assembly of claim 186 further comprising a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along the X axis and inhibits movement of the X reaction component relative to the Y reaction component along the Y axis.

198. (New) The stage assembly of claim 186 wherein the Y reaction component supports at least a portion of the X reaction component.

199. (New) The stage assembly of claim 186 wherein the X reaction component moves relative to the Y reaction component along an X axis, and the reaction components moving concurrently in the same direction along a Y axis.

200. (New) The stage assembly of claim 186 wherein the X reaction component includes a pair of spaced apart X reaction masses.



201. (New) The stage assembly of claim 186 wherein the reaction components move along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

202. (New) The stage assembly of claim 186 wherein the reaction components move concurrently along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

203. (New) An exposure apparatus including the stage assembly of claim 186.

204. (New) A device manufactured with the exposure apparatus according to claim 203.

205. (New) A wafer on which an image has been formed by the exposure apparatus of claim 203.

206. (New) A stage assembly that moves a device relative to a stage base, the stage assembly comprising:

a stage that retains the device;

a stage mover assembly connected to the stage, the stage mover assembly moving the stage with at least two degrees of freedom and generating reaction forces in at least two degrees of freedom; and

a reaction mass assembly including an X reaction component and a Y reaction component that are coupled to the stage mover assembly, the X reaction component moving relative to the Y reaction component, the Y reaction component supporting at least a portion of the X reaction component, the reaction mass assembly reducing the reaction forces in at least two degrees of freedom that are transferred to the stage base.

207. (New) The stage assembly of claim 206 wherein the stage mover assembly moves the stage along a Y axis directly causing the X reaction component and the Y reaction component to move along the Y axis.

208. (New) The stage assembly of claim 206 wherein the X reaction component moves relative to the stage base with three degrees of freedom.

209. (New) The stage assembly of claim 208 wherein the Y reaction component moves relative to the stage base with three degrees of freedom.

210. (New) The stage assembly of claim 206 wherein the stage mover assembly comprises an X stage mover that moves the stage along the X axis, the X stage mover being coupled to the X reaction component so that movement of the stage by the X stage mover results in movement of the X reaction component along the X axis.

211. (New) The stage assembly of claim 210 wherein the stage mover assembly comprises a Y stage mover that moves the stage along the Y axis, the Y stage mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

212. (New) The stage assembly of claim 206 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with two degrees of freedom.

213. (New) The stage assembly of claim 206 further comprising a reaction mover assembly that adjusts the position of at least a portion of the reaction mass assembly relative to the stage base with three degrees of freedom.

214. (New) The stage assembly of claim 206 further comprising a reaction mover assembly that adjusts the position of the Y reaction component and the X reaction component relative to the stage base along the Y axis.

215. (New) The stage assembly of claim 206 further comprising a reaction mover assembly that adjusts the position of one of the reaction components relative to the stage base about a Z axis.

216. (New) The stage assembly of claim 206 further comprising a reaction mover assembly that adjusts the position of the X reaction component and the Y reaction component relative to the stage base about a Z axis.

217. (New) The stage assembly of claim 206 wherein the X reaction component includes a first X reaction mass and a second X reaction mass that move independently along the X axis relative to the Y reaction component.

218. (New) The stage assembly of claim 206 further comprising a mass guide assembly that allows the X reaction component to move relative to the Y reaction component along the X axis and inhibits movement of the X reaction component relative to the Y reaction component along the Y axis.

219. (New) The stage assembly of claim 206 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a generally planar shaped reaction base.

220. (New) The stage assembly of claim 206 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a pair of spaced apart Y reaction masses.

221. (New) The stage assembly of claim 220 further comprising a mass guide assembly that connects the X reaction masses to the Y reaction masses, allows the X

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reaction masses to move independently relative to the Y reaction masses along the X axis and inhibits movement of the X reaction masses relative to the Y reaction masses along the Y axis.

222. (New) The stage assembly of claim 220 further comprising a reaction guide assembly that allows the Y reaction masses to move relative to the stage base along the Y axis and inhibits movement of the Y reaction masses along the X axis.

223. (New) The stage assembly of claim 220 further comprising a reaction mover assembly that adjusts the position of the X reaction masses relative to the Y reaction masses along the X axis.

224. (New) The stage assembly of claim 223 wherein the reaction mover assembly adjusts the position of the Y reaction masses and the X reaction masses relative to the stage base along the Y axis.

225. (New) The stage assembly of claim 206 wherein the X reaction component includes a pair of spaced apart X reaction masses and the Y reaction component includes a reaction frame.

226. (New) The stage assembly of claim 206 wherein the reaction components move along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

227. (New) The stage assembly of claim 206 wherein the reaction components move concurrently along a Y axis to reduce the reaction force along the Y axis that is transferred to the stage base.

228. (New) An exposure apparatus including the stage assembly of claim 206.

229. (New) A device manufactured with the exposure apparatus according to claim 228.

230. (New) A wafer on which an image has been formed by the exposure apparatus of claim 228.

231. (New) A method for making a stage assembly that moves a device relative to a stage base, the method comprising the steps of:

retaining the device with a stage;

generating reaction forces by moving the stage with two degrees of freedom with a stage mover assembly;

coupling a reaction mass assembly to the stage mover assembly, the reaction mass assembly including a Y reaction component and an X reaction component that moves relative to the Y reaction component, the reaction mass assembly reducing the reaction forces that are transferred to the stage base; and

adjusting the position of at least one of the reaction components relative to the stage base about a Z axis with a reaction mover assembly.

232. (New) The method of claim 231 wherein the step of generating reaction forces includes the step of providing an X stage mover that moves the stage along an X axis, the X stage mover being coupled to the X reaction component so that movement of stage by the X stage mover results in movement of the X reaction component along the X axis.

233. (New) The method of claim 232 wherein the step of generating reaction forces includes the step of providing a Y stage mover that moves the stage along a Y axis, the Y stage mover being coupled to the X reaction component so that movement of the stage by the Y stage mover results in movement of the X reaction component along the Y axis.

234. (New) The method of claim 231 wherein the step of coupling the reaction mass assembly includes the step of moving the X reaction component and the Y reaction component concurrently in a same direction along a Y axis.

235. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the X reaction component relative to the Y reaction component along an X axis.

236. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the Y reaction component and the X reaction component concurrently relative to the stage base along a Y axis.

237. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the Y reaction component and the X reaction component relative to the stage base along an X axis and about the Z axis.

238. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the X reaction component relative to the Y reaction component along an X axis, and adjusting the position of the Y reaction component and the X reaction component relative to the stage base along a Y axis.

239. (New) The method of claim 231 wherein the step of coupling a reaction mass assembly includes the step of providing a first X reaction mass and a second X reaction mass that move independently along an X axis.

240. (New) The method of claim 239 wherein the step of coupling a reaction mass assembly includes the step of coupling a reaction frame to the X reaction masses so that the reaction frame moves relative to the stage base along the X axis.

241. (New) The method of claim 240 wherein the step of adjusting the position includes adjusting the position of each X reaction mass relative to the reaction frame along the X axis, and adjusting the position of the reaction frame and the X reaction masses relative to the stage base along the Y axis.

242. (New) The method of claim 240 including the step of adjusting the position of the X reaction masses and the reaction frame relative to the stage base along the X axis and along the Y axis with the reaction mover assembly.

243. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the reaction mass assembly relative to the stage base along the X axis.

244. (New) The method of claim 231 wherein the step of adjusting the position includes adjusting the position of the reaction mass assembly relative to the stage base along the X axis and along the Y axis.

245. (New) A method for making an exposure apparatus that forms an image on a wafer, the method comprising the steps of:

providing an irradiation apparatus that irradiates the wafer with radiation to form the image on the wafer; and

providing the stage assembly made by the method of claim 231.

246. (New) A method of making a wafer utilizing the exposure apparatus made by the method of claim 245.

247. (New) A method of making a device including at least the exposure process: wherein the exposure process utilizes the exposure apparatus made by the method of claim 245.